



# Joint Polar Satellite System (JPSS)

## JPSS SCIENCE AND USERS

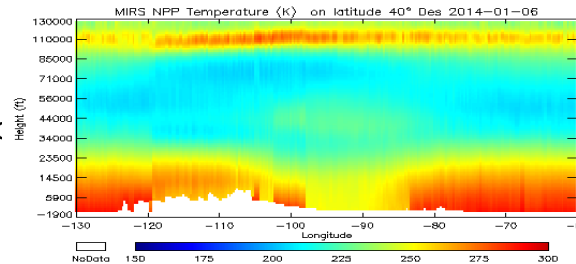
**Mitch Goldberg**

Program Scientist

Joint Polar Satellite System  
National Environmental Satellite, Data, and Information Service  
U.S. National Oceanic and Atmospheric Administration  
U.S. Department of Commerce

# JPSS provides a wide range of capabilities

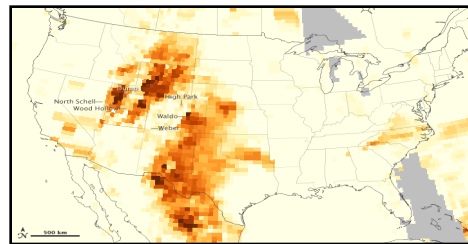
- Microwave – provides temperature and moisture soundings in cloudy conditions and rainfall rates, sea ice, snow, surface temperature - ATMS
- Infrared – provides high vertical resolution temperature and moisture soundings in clear and cloud corrected regions; atmospheric chemistry - CO, CH<sub>4</sub>, SO<sub>2</sub>, ... and cloud products - CrIS
- Visible (day & night) and Infrared Imagery (including deep blue channels) – chlorophyll, cloud imagery, cloud products, SST, Active Fires, Smoke, Aerosols, land products, Snow, Ice, oil spills... at exceptional resolution/global coverage - VIIRS
- UV - ozone - Aerosols over bright surfaces, SO<sub>2</sub> plumes, NO<sub>x</sub> (air quality)... - OMPS



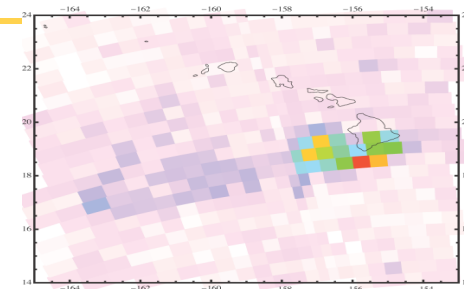
Temperature X-Section Polar Vortex



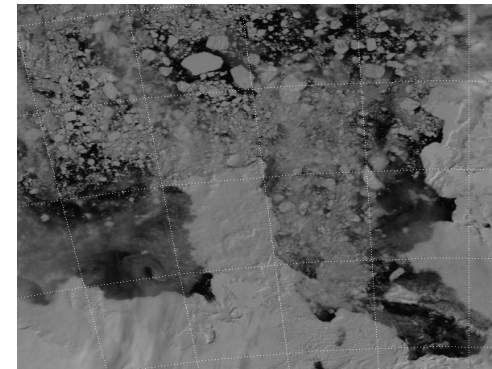
Algae in Lake Erie



OMPS Aerosols from Fires

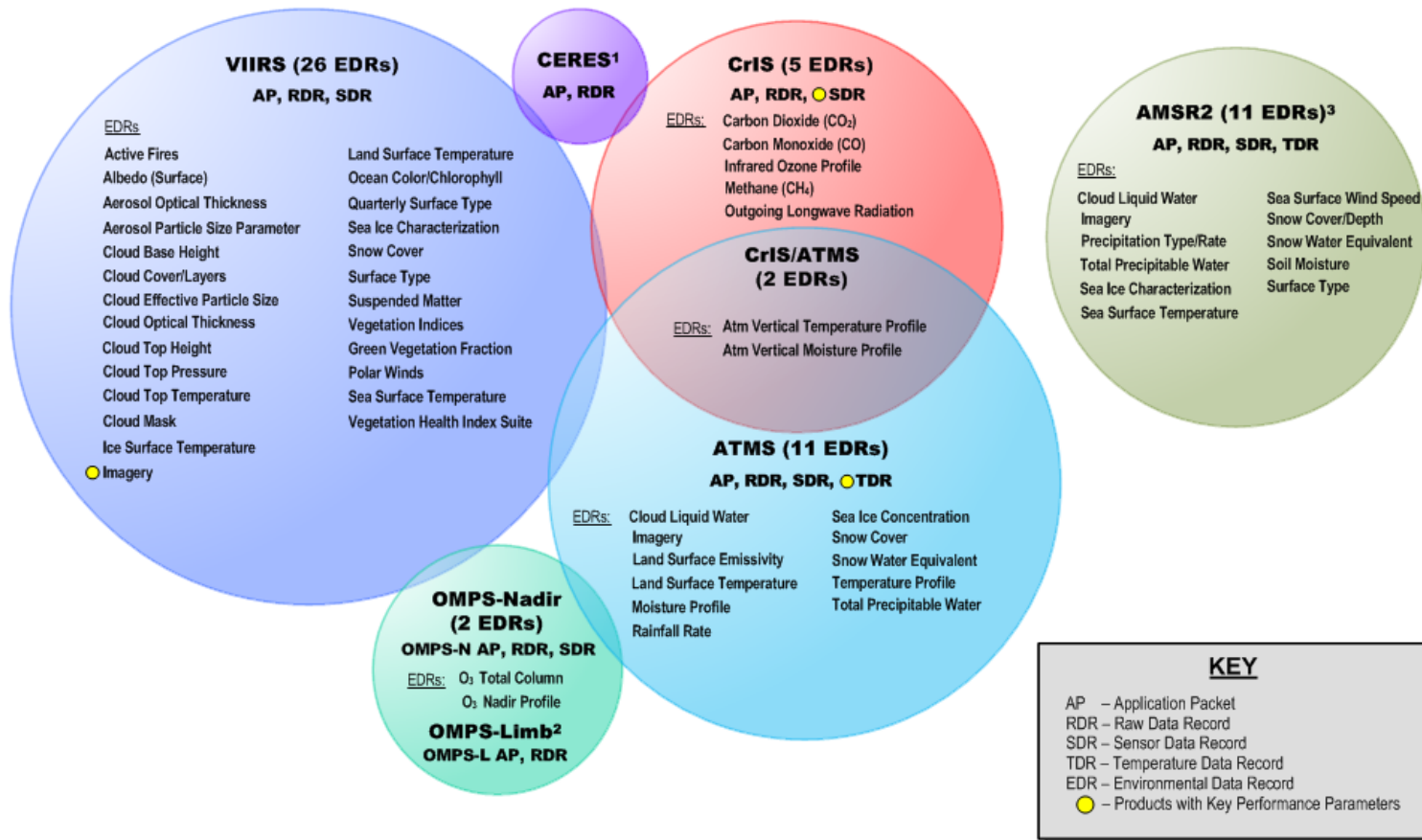


OMPS- Volcano SO<sub>2</sub> degassing



DNB Ice detection

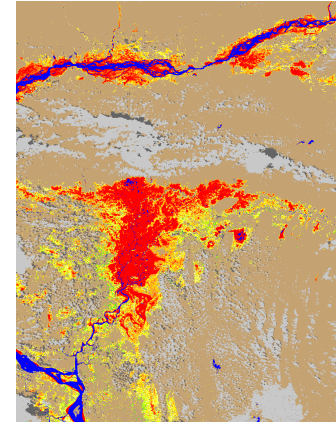
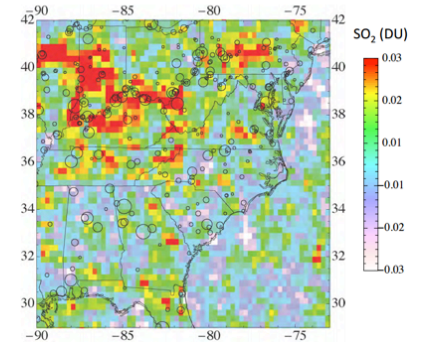
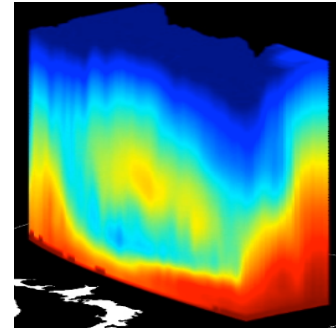
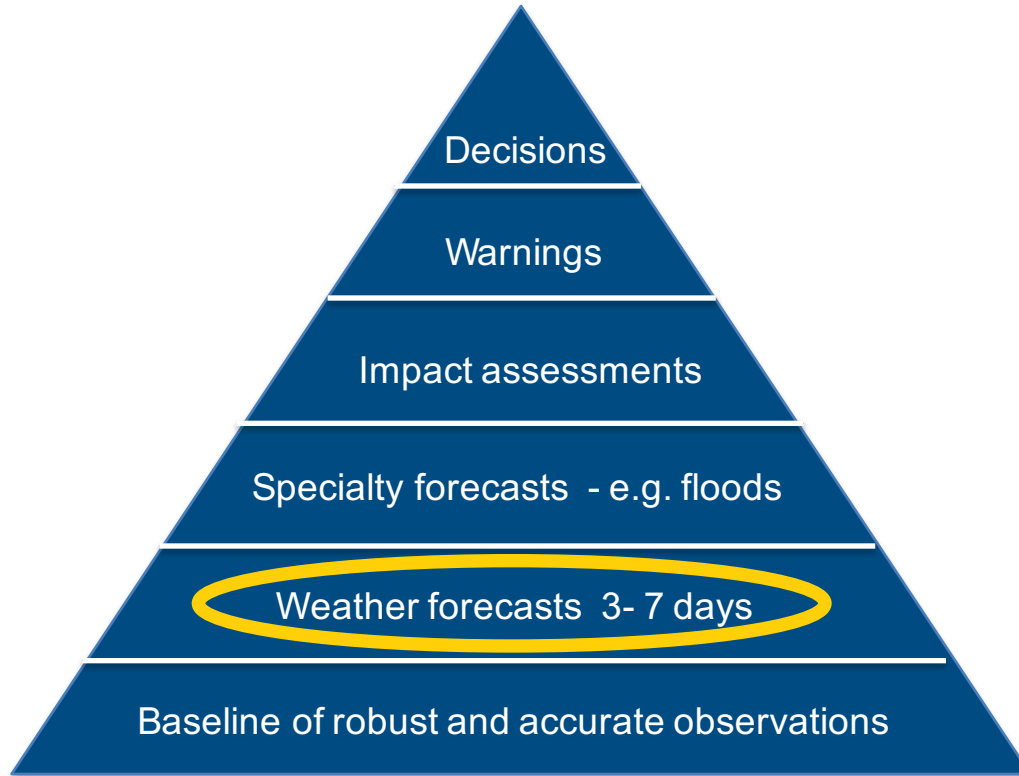
# JPSS Program Data Products



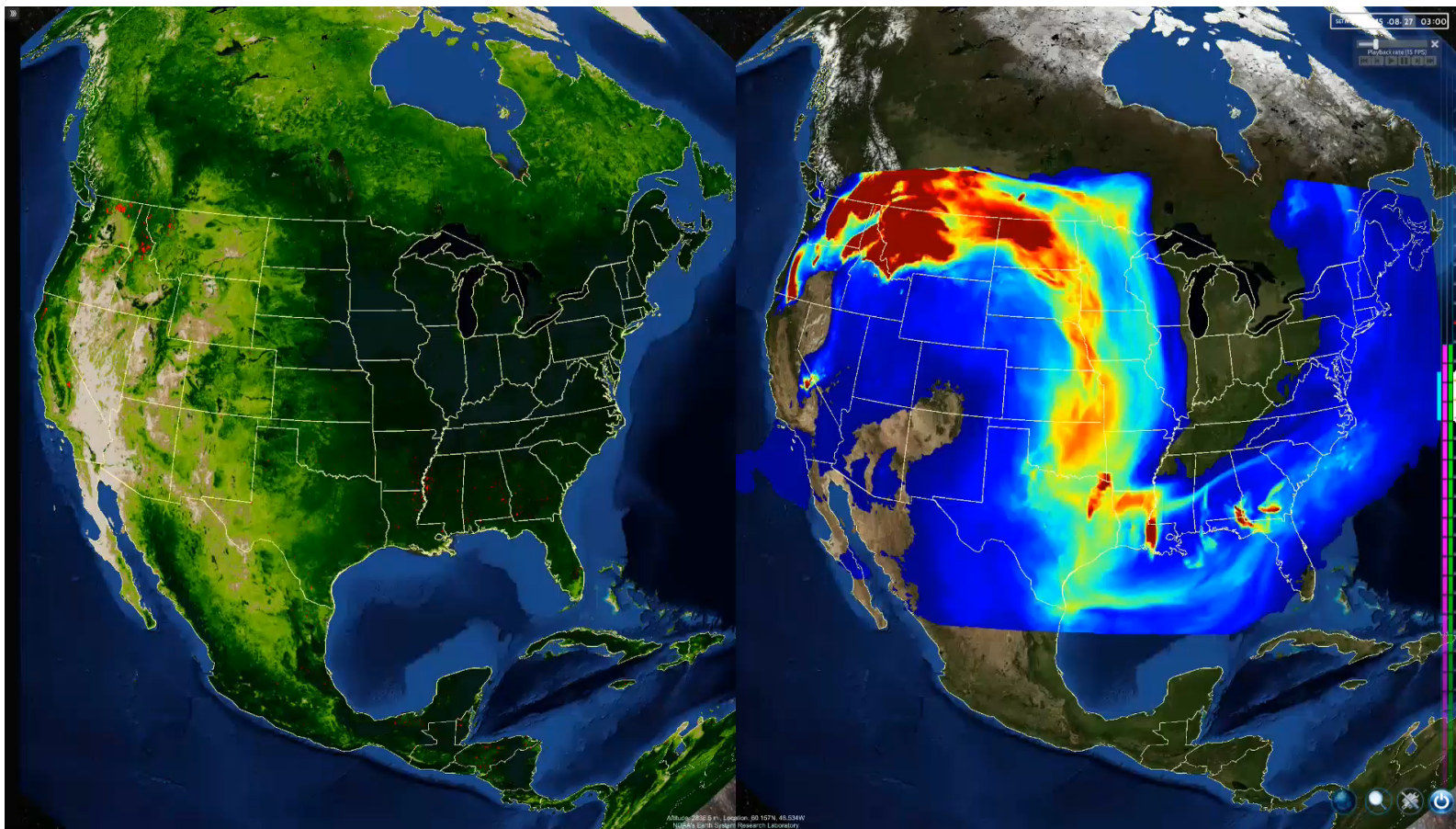




# NESDIS Science User Engagement Proving Ground Program focuses on Applications and Decision Support for NOAA Service Areas and Partners

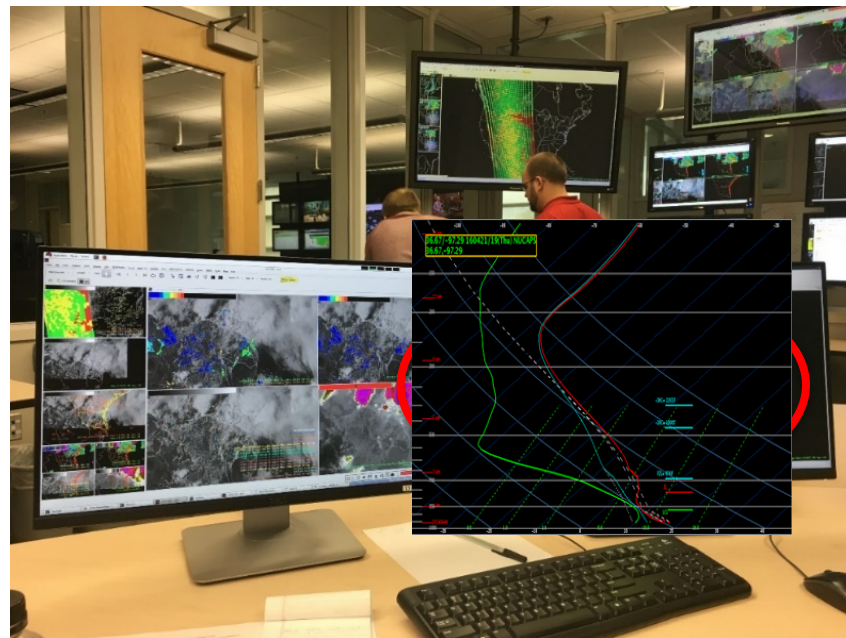
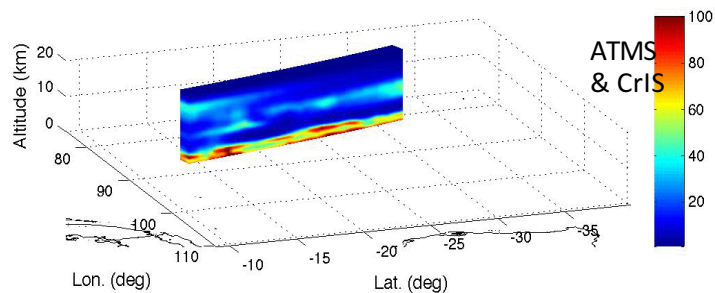
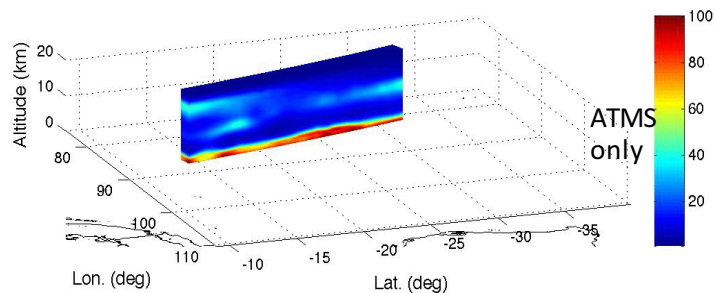


# VIIRS fire location/FRP to smoke forecasts



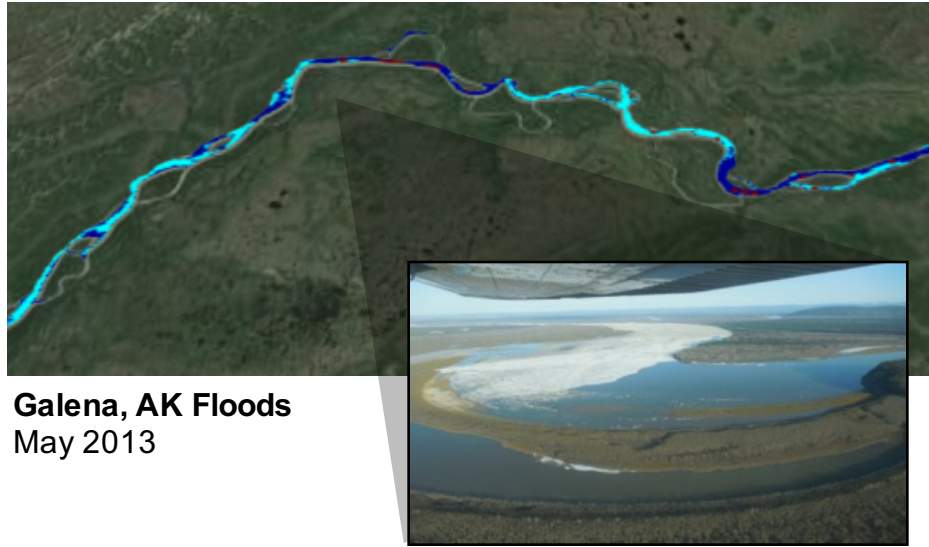
# NUCAPS Initiative

## Relative Humidity Vertical Slice

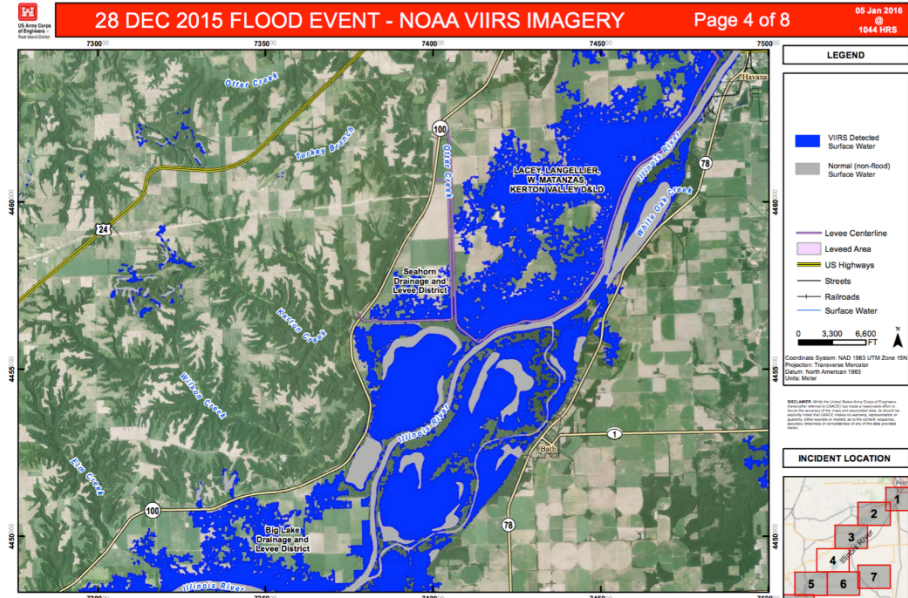




# Flood and River Ice Initiative



**Galena, AK Floods**  
May 2013

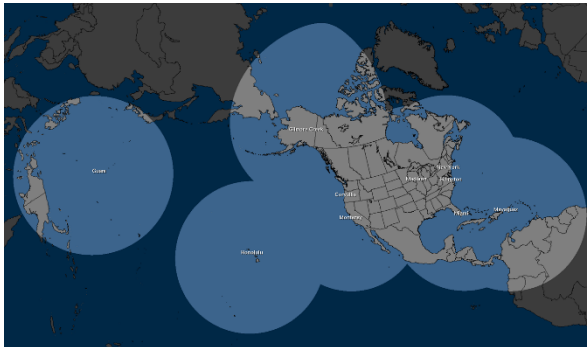


- VIIRS can identify river ice jams which can lead to large flood events
- Flooding from ice jams can occur in a very short time
- Flooding can occur from snow melt and heavy rains



# Foundation to Proving Ground

- Enterprise algorithms and Cal/Val Program
- Direct Readout Capabilities – CSPP
- STAR R&D Services
- User workshops and Training
- Management commitment
- Innovation



## STAR JPSS

STAR Joint Polar Satellite System Website

Maintaining the continuity of climate observations and critical environmental data from the polar orbit — increasing the timeliness and accuracy of severe weather threat forecasts

JPSS Home

- STAR Home
- STAR JPSS Program
- Product Teams
- JPSS Publications
- 2015 News Gallery

JPSS Instruments/CDRs

- ATMS
- OHS
- VIRS
- OMPS

Environmental Data Records

- Ocean Products
  - [Sea Surface Temperature](#)
  - Ocean Color
- Land Products
  - Active Fires
  - Land Surface Temperature
  - Surface Albedo
  - Surface Type
  - Surface Reflectance
  - Vegetation Index
  - Green Vegetation Fraction
  - Vegetation Health
- Cryosphere Products
  - Snow Cover
- Atmosphere
  - Imagery
  - Clouds
  - Aerosols
- NUCAPS (N-MW Products)
- SIRS MRS Products

Algorithm Cal/Val Maturity Product Operational Matrix

Product Monitoring

- ICV
- EDR LTM Site

Product Applications

- Part M-Money Fire
- Blizzard 2016
- Hurricane Iselle 2014
- Paraguay Flooding 2014

JPSS Home • Product Teams • Sea Surface Temperature

### Sea Surface Temperature (SST)

Team Lead: [Sasha Ignatov](#)

#### Background

SST is a priority JPSS product. It is used in many applications including monitoring of climate variability, operational weather and seasonal forecasting, military and defense operations, validation and/or forcing of the ocean and atmospheric models, ecosystem assessment, tourism, and fisheries. Satellite SST retrievals are assimilated into climate, mesoscale atmospheric, and sea surface numerical models, which form the core of the operational ocean forecasting systems.

#### Product History

Since launch of S-NPP in October 2011, and opening VIRS cryoradiator doors in January 2012, the official JPSS SST Interface Data Product System (IDPS) SST EDR has been produced and archived at CLASS ([http://class.noaa.gov](#)). Simultaneously, the JPSS SST Team at STAR started producing an experimental SST product from VIRS, using the NOAA heritage Advanced Clear Sky Processor for Ocean (ACSP) system. In January 2014, based on two years of side-by-side comparisons in the NOAA online SST Quality Monitor (SQM) ([http://www.sqm.noaa.gov](#)), and user feedback, the JPSS Program recommended to re-allocate the JPSS SST requirements from IDPS to ACSP. In March 2014, ACSP product became operational in the NOAA NPP Data Exploitation (NDE) system. It has been archived at the PD DAAC and NODC since May 2014.

#### ACSP Product and Data Access

ACSP system produces SST in each cloud-free pixel over water. ACSP Clear-Sky Mask (Petersen et al., 2010) is used. The JPSS SST algorithm is regression, stratified by day and night (Petersen et al., 2014). Skin temperature of the ocean (at depths on the order of 10 microns) is retrieved. Level 2 product (in swath projection) has daily data volume of ~27 GB/day. Its gridded (0.02°, approximately 2km at equator, 0.85GB/Day) Level 3U (unofficial) counterpart was introduced in ACSP v2.4.0 in May 2015. Both L2 and L3U products are organized in 10min granules and reported in the Group for High-Resolution SST (GHRSSST) Data Specifications version 2 (GDS2) NetCDF4 format. In addition to SST, estimates of its systematic and random errors (bias and standard deviation) are also reported.

#### Users

ACSP VIRS L2P SST is currently used in the NOAA Geo-Polar Blended L4 analysis, and in the Canadian Meteorological Centre (CMC) L4 analysis. Based on consideration of data volume, several L4 producers (including Australian Bureau of Meteorology, to support GAMESA L4 analysis; Met Office, to support OSTIA L4 analysis; and Japanese Met

ACSP Regional SST Monitor, Baja, California, 11/1/2015 - click to enlarge

ACSP L2P products and data:

- [L2C](#)

L3U products and data:

- [L3U](#)

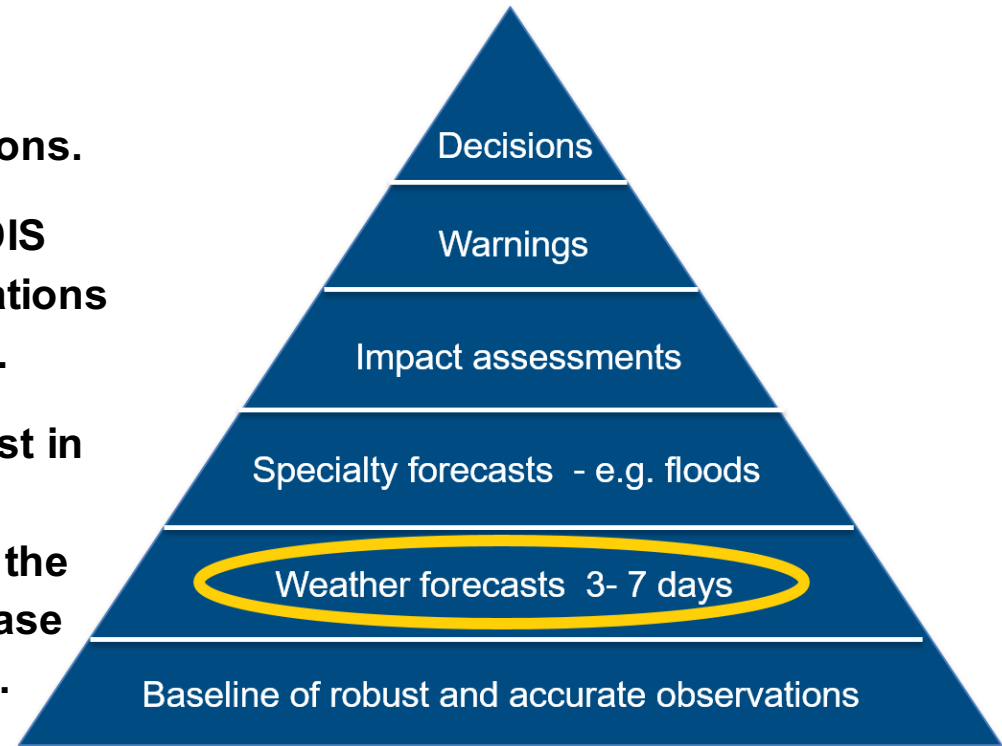
EDR Long-Term Monitoring

- [SST](#)
- [SST Quality Monitor](#)
- [SST Regional Monitor](#)

Documentation

- [ACSP SST ATBD](#) (PDF, 2.7 MB)

- **Research to Operations is more than developing new products and transitioning them to NESDIS Operations.**
- **Its more about the utilization of NESDIS Operational Products by User Applications (fire products in NWS smoke models).**
- **Every satellite program needs to invest in a User Readiness Program ( Proving Ground) because the goal is to reach the top of the pyramid even though the base of the pyramid is extremely important.**



# Thank You!



[www.jpss.noaa.gov](http://www.jpss.noaa.gov)